EFFECT OF HIGH LEVEL OF PHENYL ALANINE ON OTHER AMINO ACIDS IN PATIENTS WITH PHENYL KETONURIA

THESIS

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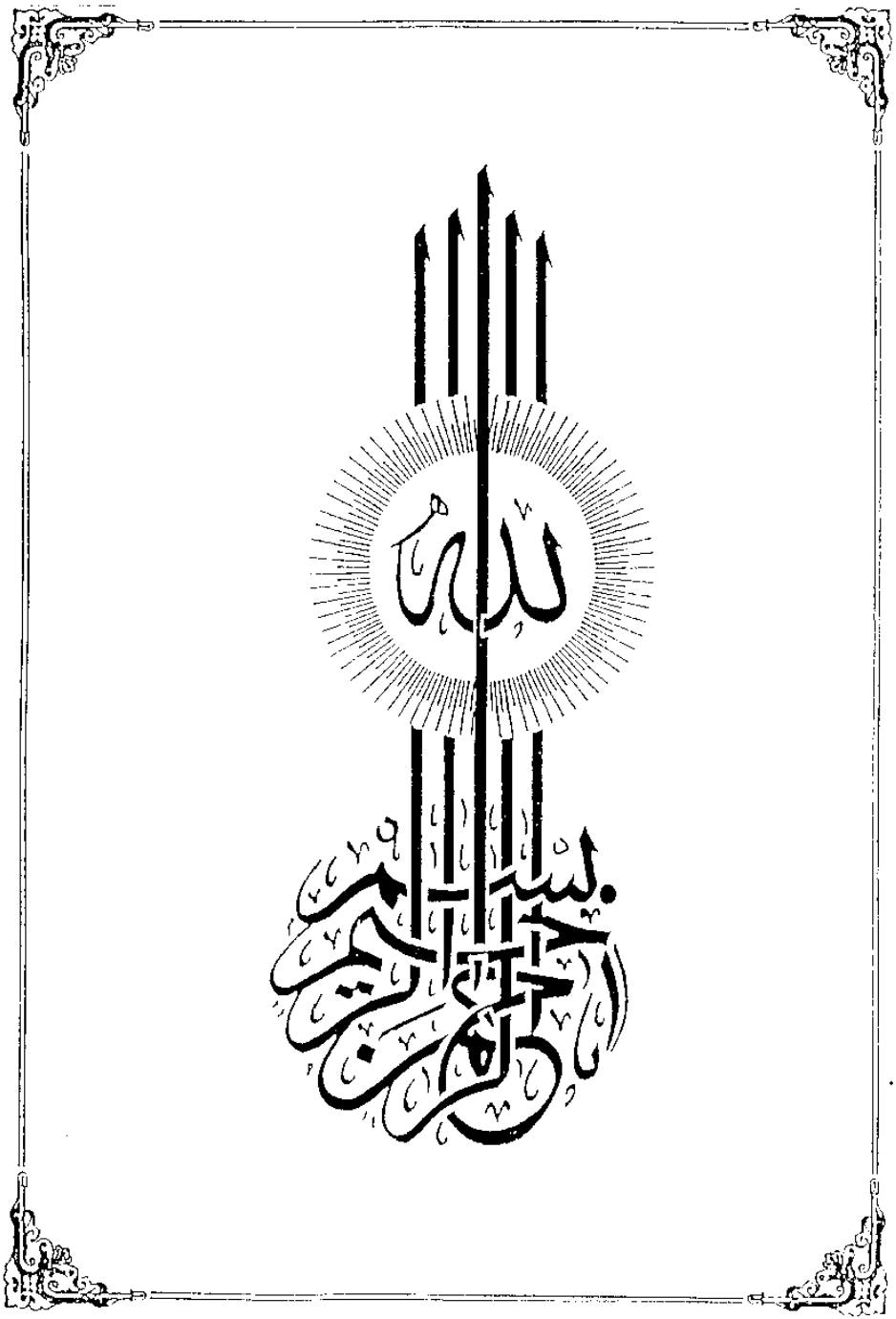
سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا
إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

صَدَقَ اللهُ الْعَظِيمُ



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LIST OF ABBREVIATIONS

Ala. : Alanine.

a.a. : Amino acids.

Arg. : Arginine.

Asp. : Aspargine.

B-am. : Beta amino butyric acid.

Glut.a : Glutamic acid.

Glut. : Glutamine.

Glyc. : Glycine.

Isol. : Isoleucine.

Leuc. : Leucine.

Lys. : Lysine.

Ph.ala.: Phenylalanine.

PKU. : PhenylKetonuria.

Prol. : Proline.

Ser. : Serine.

Thr. : Threonine.

Tyr. : Tryosine

Val. : Valine.

LIST OF FIGURES

INTRODUCTION AND AIM OF WORK

INTRODUCTION

Phenyl ketonuria (PKU) is an inborn error of metabolism caused by decreased activity of phenyl alanine hydroxylase, the enzyme responsible for the conversion of phenyl alanine to tyrosine (Manunes, 1980).

Folling (1934), described 10 mentally retarded patients who excerted phenyl pyruvic acid in urine.

Such patients were soon demonstrated to accumulate large amounts of phenyl alanine in body fluids. The condition was shown to be inherited as an autosomal recessive disease (Marrow and Aurbach, 1983).

Its incidence is 1 : 14000 (Levy, 1973). Mannus (1980) showed that high level of phenyl alanine and its abnormal metabolities lead to secondary damage of the central nervous system.

It has been noted that other amino acids are present in low concentration, which show further decrease after increasing the level of phenyl alanine in untreated patients with PKU (Efron, et al, 1969).

Aim of the Work:

The aim of this work is to study the relation between high level of phenyl alanine and the level of other amino acids in urine and plasma in untreated patients with PKU.

REVIEW OF LITERATURE

Epidemiology :

Phenyl ketonuria (phenyl pyruvic oligophrenia, PKU) is a disease of considerable historical significance. It is one of earliest disorders in which severe mental retardation and seizures could be linked to the excretion of an abnormal chemical substance, phenyl pyruvic acid in the urine (Folling, 1934), and the elevation of an amino acid; phenyl alanine in the blood and spinal fluid (Jervis et al., 1940).

In(1953) Jervis discovered that the disease was characterized by a marked decrease in the enzyme phenyl alanine hydroxylase in liver cells, thus establishing its genotype specificity. This enzyme deficiency impairs the oxidation of phenyl alanine to tyrosine.

PKU is also the first of the amino acid disturbance in which it was recognized that restriction of the offending metabolities in the diet offers a method of treatment (Bickel et al., 1953). So with good care

of the PKU infant from the early weeks of life, adequate intellectual development takes place (Kang et al., 1970).

Apart from its great historical interest, PKU is one of the most common inherited disorders of amino acid metabolism which has resulted in considerable number of pathological and biochemical observations of human nervous system of patients dying with this disorder (Kaufman, 1986).